Series III B&K Components Device Interface Protocol (BKC-DIP) Product Specific Appendices

For use with:
AVR 505, AVR 507, and Reference 50
AVR 212i, AVR 315, AVR 317, and Reference 31
AVR212 and Reference 21

Version 1.00.04

Table Of Contents

REVISION HISTORY **4**

VERSION 1.00.04 4
VERSION 1.00.03 4
VERSION 1.00.02 4
VERSION 1.00.01 4
VERSION 1.00.00 4

INTRODUCTION **5**

OVERVIEW 5
DOCUMENT CONVENTIONS 5

APPENDIX A, PRESET PARAMETERS **6**

PRESET ZONE 1 (A) PARAMETERS 6
PRESET ZONE 2 (B) PARAMETERS 8
APPENDIX A, PRESET PARAMETER NOTES (ALL ZONES) 8

APPENDIX B, SYSTEM PARAMETERS **12**

APPENDIX B, SYSTEM PARAMETER NOTES 16

APPENDIX C, TUNER STATION PARAMETERS **20**

APPENDIX D, REALTIME STATUS PARAMETERS **21**

APPENDIX D, REALTIME STATUS PARAMETER NOTES 21

APPENDIX E, UNIT PARAMETERS **24**

APPENDIX F, IR COMMANDS **25**

APPENDIX G, FRONT PANEL COMMANDS **27**

APPENDIX H, VALID ASCII DISPLAY CHARACTERS **28**

APPENDIX I, SPECIAL DISPLAY CHARACTERS **29**

APPENDIX J, ASCII TABLE **30**

APPENDIX K, LED MAPPING **31**

APPENDIX L, X (EXECUTIVE) COMMANDS **32**

RECALL PRESET COMMAND: (RECEIVEID, X, 0, Z=NN; CS16) 32
SAVE PRESET COMMAND: (RECEIVEID, X, 1, Z=NN, AUTONAMEMODE; CS16) 32
POWER STATE COMMAND: (RECEIVEID, X, 2, Z=ONOFF; CS16) 32
NOISE GENERATOR STATE COMMAND: (RECEIVEID, X, 3, NOISESTATE; CS16) 33
NOISE STEERING COMMAND: (RECEIVEID, X, 4, SPEAKERINDEX=ONOFF, ... SPEAKERINDEX=ONOFF; CS16) 33
NOISE INCREMENT COMMAND: (RECEIVEID, X, 5; CS16) 34
COLD BOOT COMMAND: (RECEIVEID, X, 6; CS16) 35
FACTORY RESET COMMAND: (RECEIVEID, X, 7; CS16) 35
REINITIALIZE BKC-DIP STATE COMMAND: (RECEIVEID, X, 8; CS16) 35

TEST TONE STATE COMMAND: (RECEIVEID, X, 9, LEVEL; CS16) 36
MUTE STATE COMMAND: (RECEIVEID, X, A, Z=MUTESTATE; CS16) 36

APPENDIX M, ERROR LOGS 37

PRESERVED STATE ERROR, IDENTIFIER 0 37
UNUSED RAM ERROR, IDENTIFIER 1 37
NON-VOLATILE MEMORY ERROR, IDENTIFIER 2 37
DSP BOOT ERROR, IDENTIFIER 3 37

APPENDIX P, OVERRIDE PARAMETERS 38

APPENDIX P, OVERRIDE PARAMETERS NOTES 38

APPENDIX Q, STATUS MESSAGES 39

Revision History

Version 1.00.04

1. Corrected error with Preset Parameters 9C to A3 (Note 25). There is no Music or Movie options while in Input x Surround Decoder Type Dolby Pro Logic.
2. Corrected error with System Parameters C6 to CD (Note 52). There is no Music or Movie options for Default Input x Surround Decoder Type Dolby Pro Logic.
3. Corrected error with Preset Parameter A5 (Note 27). The correct values for `DPLII Dimension` are –3 … +3 (0 to 7), not 0 to 6.
4. Corrected error with System Parameter D2 (Note 54). The correct values for `DPLII Dimension` are –3 … +3 (0 to 7), not 0 to 6.

Version 1.00.03

5. Corrected miscellaneous System and Parameter notes.

Version 1.00.02

6. Corrected Introduction:Overview and Appendix C to read “Series III” instead of “Series II”.

Version 1.00.01

1. Corrected Appendix G, Front Panel Commands to account for Source Down encoder message

Version 1.00.00

1. This is the first release of this documentation.
2. For use with BKC-DIP V2.00 protocol.

Introduction

Overview

The following is a supplement to B&K Components Device Interface Protocol, BKC-DIP. This document contains the specific BKC-DIP implementation details for the B&K Components' Series III products.

Document Conventions

All numbers are assumed to be hexadecimal. Hexadecimal (or Hex for short) characters range from 0 to F.

For example:

The number 19 is the hexadecimal number 19 which is $(1 \times 16^1) + (9 \times 16^0)$ or 25 decimal. Similarly, EA is the hexadecimal number EA which is $(14 \times 16^1) + (10 \times 16^0)$ or 234 decimal. For clarity, some descriptions regarding numbers may use the *xx*h notation to remind the reader that the number is implicitly hexadecimal where *xx* are the hexadecimal characters 0 - F. Thus the previous examples would be 19h and EAh respectively, the "h" indicating hexadecimal.

Maximum values appearing in double quotes indicate that the parameter is an ASCII string.

For example:

"D" for the Z1(A)Title maximum value indicates that the title is a string with a maximum length of 0Dh (13 decimal) characters.

Italics indicate a non-literal string.

For example:

(00,G, P00, 0;*cs16*)

cs16 indicates the calculated checksum and does NOT literally appear in the data stream.

Important concepts are denoted by **NOTE:**

Appendix A, Preset Parameters

Preset Zone 1 (A) Parameters

(0,G,P1=FF,0;*cs16*) Example of Get Z1(A) current preset title
(0,S,P1=A,1=60;*cs16*) Example of Set Z1(A) Preset 10 volume = 0 dB

Parameter Identifier (in hex)	Description	Parameter Max Values (in hex)	Formatting Notes
00	Title	"D"	
01	Volume	6F	Note 1
03	Current Audio Input	7	Note 3_Z1
04	Tuner Band	1	Note 4
05	Tuner AM Frequency	74, 81	Note 5, 5a
06	Tuner FM Frequency	67, CD	Note 6, 6a
07	Tuner FM Mode	1	Note 7
08	Tuner Audio Mode	3	Note 21
0A	Center Level	30	Note 2
0C	Rear Level	30	Note 2
0E	Sub Level	30	Note 2
0F	V1 Audio Mode	4	Note 8
16	V2 Audio Mode	4	Note 8
1D	TV (V3) Audio Mode	4	Note 8
24	DVD Audio Mode	4	Note 8
2B	CD Audio Mode	4	Note 8
32	SAT Audio Mode	4	Note 8
39	Tape Audio Mode	3	Note 21
4A	Bass Gain	30	Note 9
52	Treble Gain	30	Note 9
62	Z1(A) Favorite	1	Note 17
63	EQ Selection	3	Note 10
64	Bass Frequency	38	Note 11
6C	Treble Frequency	8C	Note 12
6D	Z1(A) Current Video	7	Note 22
6E	Z1(A) Current Tape Audio	6	Note 19_Z1
6F	Z1(A) Current Tape Video	6	Note 23
70	Speaker Selection Override	2	Note 14
71	Tuner MONO Speaker Selection	9	Note 18
72	Tuner STEREO Speaker Selection	9	Note 18
73	Tuner SURROUND Speaker Selection	9	Note 18
74	Tuner THX Speaker Selection	9	Note 18
76	V1 MONO Speaker Selection	9	Note 18
77	V1 STEREO Speaker Selection	9	Note 18
78	V1 SURROUND Speaker Selection	9	Note 18
79	V1 THX Speaker Selection	9	Note 18*
7A	V1 DVD Audio Speaker Selection	9	Note 18
7B	V2 MONO Speaker Selection	9	Note 18
7C	V2 STEREO Speaker Selection	9	Note 18
7D	V2 SURROUND Speaker Selection	9	Note 18
7E	V2 THX Speaker Selection	9	Note 18*
7F	V2 DVD Audio Speaker Selection	9	Note 18
80	TV (V3) MONO Speaker Selection	9	Note 18

81	TV (V3) STEREO Speaker Selection	9	Note 18
82	TV (V3) SURROUND Speaker Selection	9	Note 18
83	TV (V3) THX Speaker Selection	9	Note 18*
84	TV (V3) DVD Audio Speaker Selection	9	Note 18
85	DVD MONO Speaker Selection	9	Note 18
86	DVD STEREO Speaker Selection	9	Note 18
87	DVD SURROUND Speaker Selection	9	Note 18
88	DVD THX Speaker Selection	9	Note 18*
89	DVD DVD Audio Speaker Selection	9	Note 18
8A	CD MONO Speaker Selection	9	Note 18
8B	CD STEREO Speaker Selection	9	Note 18
8C	CD SURROUND Speaker Selection	9	Note 18
8D	CD THX Speaker Selection	9	Note 18*
8E	CD DVD Audio Speaker Selection	9	Note 18
8F	SAT MONO Speaker Selection	9	Note 18
90	SAT STEREO Speaker Selection	9	Note 18
91	SAT SURROUND Speaker Selection	9	Note 18
92	SAT THX Speaker Selection	9	Note 18*
93	SAT DVD Audio Speaker Selection	9	Note 18
94	TAPE MONO Speaker Selection	9	Note 18
95	TAPE STEREO Speaker Selection	9	Note 18
96	TAPE SURROUND Speaker Selection	9	Note 18
97	TAPE THX Speaker Selection	9	Note 18*
99	LFE Attenuation	30	Note 16
9B	Dynamic Range	1	Note 24
9C	TUNER Surround Decoder Type	4	Note 25
9D	V1 Surround Decoder Type	4	Note 25
9E	V2 Surround Decoder Type	4	Note 25
9F	TV (V3) Surround Decoder Type	4	Note 25
A0	DVD Surround Decoder Type	4	Note 25
A1	CD Surround Decoder Type	4	Note 25
A2	SAT Surround Decoder Type	4	Note 25
A3	TAPE Surround Decoder Type	4	Note 25
A4	DPLII Center Width	7	Note 26
A5	DPLII Dimension	7	Note 27
A6	DPLII Panorama	1	Note 17
A7	NEO:6 Center Image	5	Note 28
A8	TUNER Multi-Channel Surround Type	1	Note 29
A9	V1 Multi-Channel Surround Type	1	Note 29
AA	V2 Multi-Channel Surround Type	1	Note 29
AB	TV (V3) Multi-Channel Surround Type	1	Note 29
AC	DVD Multi-Channel Surround Type	1	Note 29
AD	CD Multi-Channel Surround Type	1	Note 29
AE	SAT Multi-Channel Surround Type	1	Note 29
AF	TAPE Multi-Channel Surround Type	1	Note 29

Current Audio Input Aliases			Note 20
ED	Current Audio Input Mono Mode Speaker Selection	C	Note 18
EE	Current Audio Input Stereo Mode Speaker Selection	C	Note 18
EF	Current Audio Input Surround Mode Speaker Selection	C	Note 18
F0	Current Audio Input THX Mode Speaker Selection	C	Note 18*
F1	Current Audio Input DVD Audio Mode Speaker Selection	C	Note 18

F2	Current Audio Input Current Mode Speaker Selection	C	Note 18
F3	Current Audio Input Audio Mode	5	Note 8

Preset Zone 2 (B) Parameters

(0,G,P2=FF,0;*cs16*) Example of Get Z2(B) current preset title
(0,S,P2=A,1=60;*cs16*) Example of Set Z2(B) Preset 10 volume = 0 dB

Parameter Identifier (in hex)	**Description**	**Parameter Max Values (in hex)**	**Formatting Notes Notes**
00	Title	"D"	
01	Volume	6F	Note 1
03	Current Audio Input	7	Note 3_Z2
04	Tuner Band	1	Note 4
05	Tuner AM Frequency	74, 81	Note 5, 5a
06	Tuner FM Frequency	67, CD	Note 6, 6a
07	Tuner FM Mode	1	Note 7
09	Z2(B) Favorite	1	Note 17
0A	Z2(B) Current Video	7	Note 3_Z2
0B	Z2(B) Current V2 Audio	7	Note 19_Z2
0C	Z2(B) Current V2 Video	7	Note 22

Appendix A, Preset Parameter Notes (All Zones)

(0,G,P1=FF,0;*cs16*) Example of Get Z1 current preset title
(0,S,P1=A,1=60;*cs16*) Example of Set Z1 Preset 10 volume = 0 dB
(0,G,P2=FF,0;*cs16*) Example of Get Z2 current preset title
(0,S,P2=A,1=60;*cs16*) Example of Set Z2 Preset 10 volume = 0 dB

(**NOTE:** hex values denoted by *xx*h convention)

Note 1: 0h = Mute, 1h = -95 dB,... 60h = 0 dB, ... 6Fh = +15 dB
Note 2: 0h = -12.0 dB, 1h = -11.5 dB, ... 18h = 0.0 dB, ... 30h = +12.0 dB
Note 3_Z1: 0h = Tuner, 1h = V1, 2h = V2, 3h = TV/V3, 4h = DVD, 5h = CD, 6h = SAT, 7h = TAPE.
NOTE: Changing the Current Z1(A) Audio Input can affect the Current Z1(A) Tape Audio Input if the selected input is NOT TAPE. If Current Z1(A) Audio Input is set to TAPE, the Current Z1(A) Tape Audio Input remains whatever the previous Current Z1(A) Audio Input was.

For example:
If Current Z1(A) Audio Input = CD and is changed to DVD, the Current Z1 Tape Audio Input is also forced to the DVD input.

If Current Z1(A) Audio Input = CD and is changed to TAPE, the Current Z1(A) Tape Audio

Input remains CD.

NOTE: If the Z1(A) Audio/Video Link is true, changing the audio input also changes the Current Z1(A) Video Input (and also the Current Z1 Tape Video Input if Current Z1(A) Audio Input is NOT TAPE).

Note 3_Z2: 0h = Tuner, 1h = V1, 2h = V2, 3h = TV (V3), 4h = DVD, 5h = CD, 6h = SAT, 7h = TAPE.

NOTE: Changing the Current Z2(B) Audio Input can affect the Current Z2(B) V2 Audio Input if the selected input is NOT V2. If Current Z2(B) Audio Input is set to V2, the Current Z2(B) V2 Audio Input remains whatever the previous Current Z2(B) Audio Input was.

For example:

If Current Z2(B) Audio Input = CD and is changed to DVD, the Current Z2(B) V2 Audio Input is also forced to the DVD input.

If Current Z2(B) Audio Input = CD and is changed to V2, the Current Z2(B) V2 Audio Input remains CD.

NOTE: If the Z2(B) Audio/Video Link is true, changing the audio input also changes the Current Z2(B) Video Input (and also the Current Z1(A) V2 Video Input if Current Z2(B) Audio Input is NOT V2).

Note 4: 0h = AM, 1h = FM

Note 5: 10 kHz AM step tuning (USA)

if value = 0,

indicates uninitialized "OPEN" frequency

else,

(((*value* - 1)* 10) + 520) = frequency in kHz

((frequency – 520) / 10) + 1 = value

For example of AM Frequency of 2Ch:

(((2Ch - 1) * 10) + 520 = 950 kHz

((950 kHz – 520) / 10) + 1 = 2Ch

NOTE: If the recalled preset contains an OPEN frequency, the previous state of the tuner is unchanged.

Note 5a: 9 kHz AM step tuning

if value = 0,

indicates uninitialized "OPEN" frequency

else,

(((*value* - 1)* 9) + 522) = frequency in kHz

((frequency – 522) / 9) + 1 = value

For example of AM Frequency of 2Bh:

(((2Bh - 1) * 9) + 522 = 900 kHz

((900 kHz – 522) / 9) + 1 = 2Bh

NOTE: If the recalled preset contains an OPEN frequency,

the previous state of the tuner is unchanged.

Note 6: 200 kHz FM step tuning (USA)
if value = 0,
indicates uninitialized "OPEN" frequency
else,
(((*value* - 1)* 0.20) + 87.5) = frequency in MHz
((frequency – 87.5) / 0.20) + 1 = value

For example of FM Frequency of 2Eh:
(((2Eh - 1) * 0.20) + 87.5 = 96.5 MHz
((96.5 MHz – 87.5) / 0.20) + 1 = 29h

NOTE: If the recalled preset contains an OPEN frequency, the previous state of the tuner is unchanged.

Note 6a: 100 kHz FM step tuning
if value = 0,
indicates uninitialized "OPEN" frequency
else,
(((*value* - 1)* 0.10) + 87.5) = frequency in MHz
((frequency – 87.5) / 0.10) + 1 = value

For example of FM Frequency of 5Bh:
(((5Bh - 1) * 0.10) + 87.5 = 96.5 MHz
((96.5 MHz – 87.5) / 0.10) + 1 = 5Bh

NOTE: If the recalled preset contains an OPEN frequency, the previous state of the tuner is unchanged.

Note 7: 0h = Mono, 1h = Stereo

Note 8: 0h = Mono, 1h = Stereo, 2h = Surround, 3h = THX, 4h = DVD Audio

Note 9: 0h = -18 dB, 1h = 17.5 dB,..., 24h = 0 dB, 30h = +6 dB

Note 10: 0h = Off, 1h = Variable, 2h = Loudness, 3h = Theater

Note 11: 0h = 20 Hz, 1h = 25 Hz, ...,37h = 300Hz

Note 12: 0h =2.0 kHz, 1h = 2.1 kHz, ...,8Bh = 16.0 kHz

Note 13: 0h = Off, 1h = On

Note 14: 0h = Speaker Selection, 1h = HeadPhone, 2h = LtRt

Note 15: 0h = Left 0.0 dB Right –12.0 dB, 1h = Left 0.0 dB Right –11.5 dB, ... 18h = Centered, ... 2Fh = Left –11.5 dB Right 0.0 dB, 30h = Left –12.0 dB Right 0.0 dB.

Note 16: 0h = -24 dB, 1h = 23.5 dB, ..., 30h = 0 dB

Note 17: 0h = No, 1h = Yes

Note 18: 0h = One Speaker, 1h = Two Speakers, 2h = Three Speakers, 3h = Four Speakers Sides, 4h = Four Speakers Back, 5h = Five Speakers Sides, 6h = Five Speakers Back, 7h = Six Speakers, 8h = Seven Speakers, 9h = Two Speakers Direct, Ah = Two Speakers LtRt, Bh = Two Speakers Headphone

Note 19_Z1: 0h = Tuner, 1h = V1, 2h = V2, 3h = TV/V3, 4h = DVD, 5h = CD, 6h = SAT.
NOTE: The input will be forced back to the Current Z1 Audio Input if the Current Z1(A) Audio Input is NOT set to TAPE. Reading Current Z1(A) Tape Audio Input will reflect this forced behavior.
NOTE: TAPE is not a valid input.

NOTE: Changing the Current Z1(A) Audio Input will overwrite this parameter.

Note 19_Z2: 0h = Tuner, 1h = V1, 2h = V2, 3h = TV/V3, 4h = DVD, 5h = CD, 6h = SAT, 7h = TAPE.

NOTE: The input will be forced back to the Current Z2(B) Audio Input if the Current Z2(B) V2 Input is NOT set to V2. Reading Current Z2(B) V2 Audio Input will reflect this forced behavior.

NOTE: If the System Parameter "V2 Line Out", 2Dh, is set to "Tape Level", 0h, is V2 is not a valid input. Attempting to set the Current Z2(B) V2 Audio Input to V2 under these conditions caused the V2 Audio Input to be forced to the previous Current Z2(B) Audio Input. Reading Current Z2(B) V2 Audio Input will reflect this forced behavior.

NOTE: Changing the Current Z2(B) Audio Input will overwrite this parameter.

Note 20: Current Audio Input aliases implicitly use the Z1(A) Current Audio Input when referring to source specific parameters

Note 21: 0h = Mono, 1h = Stereo, 2h = Surround, 3h = THX

Note 22: 0h = None, 1h = V1, 2h = V2, 3h = TV/V3, 4h = DVD, 5h = CD, 6h = SAT, 7h = TAPE.

NOTE: If the zone Audio/Video Link is active, changing the Current zone Audio Input will overwrite this parameter.

Note 23: 0h = None, 1h = V1, 2h = V2, 3h = TV/V3, 4h = DVD, 5h = CD, 6h = SAT.

NOTE: If the zone Audio/Video Link is active, changing the Current zone Audio Input will overwrite this parameter.

Note 24: 0h = Normal, 1h = Reduced

Note 25: 0h = NEO:6 Movie, 1h = NEO:6 Music, 2h = Dolby Pro Logic II Movie, 3h = Dolby Pro Logic II Music, 4h = Dolby Pro Logic

Note 26: 0h = 0, 1h = 1, … 7h = 7

Note 27: 0h = -3, 1h = -2, … 5h = -+2, 7h = +3

Note 28: 0h = 0.0, 1h = 0.1, … 5h = 0.5

Note 29: 0h = Surround Movie, 1h = Surround Music, 0h = THX Movie, 1h = THX Music

Appendix B, System Parameters

(0,G,S,13;*cs16*) Example of Get System Surround Setting
(0,S,S,3=”LASER”;*cs16*) Example of Set DVD Title to “LASER”

Parameter Identifier (in hex)	Description	Parameter Max Values (in hex)	Formatting Notes
00	V1 Title	"5"	
01	V2 Title	"5"	
02	TV (V3) Title	"5"	
03	DVD Title	"5"	
04	CD Title	"5"	
05	SAT Title	"5"	
06	Tape Title	"5"	
07	Power On Title Line 1	"10"	
08	Power On Title Line 2	"10"	
09	Left Level Offset	30	Note 1
0A	Center Level Offset	30	Note 1
0B	Right Level Offset	30	Note 1
0C	Right Surround Level Offset	30	Note 1
0D	Left Surround Level Offset	30	Note 1
0E	Sub Level Offset	30	Note 1
0F	Left/Right Front Setting	1	Note 2
10	Surround Operation	1	Note 3
12	Center Setting	2	Note 5
13	Surround Setting	2	Note 5
15	Sub Bass Setting	2	Note 6
16	Center Delay	C5	Note 7
18	Tuner Level	18	Note 8
19	V1 Level	18	Note 8
1A	V2 Level	18	Note 8
1B	TV (V3) Level	18	Note 8
1C	DVD Level	18	Note 8
1D	CD Level	18	Note 8
1E	SAT Level	18	Note 8
1F	Tape Level	18	Note 8
20	Color Scheme	A	Note 9
21	Overlay Scheme	3	Note 10
22	OSD Enable Setting	2	Note 57
23	Monitor Type	1	Note 12
24	Display Level Setting	2	Note 13
27	Z1 (A) Max Level	6F	Note 14
29	V1 Line Out	1	Note 16
2A	Z2 (B) Max Level	6F	Note 14
2B	Z2 (B) Fixed	2	Note 17
2D	V2 Line Out	1	Note 16
2E	RS 232 Port Enabled	1	Note 11
2F	RS 232 Baud Rate	8	Note 18
30	BKC-DIP Receive ID	7F	Note 19
31	BKC-DIP Transmit ID	7F	Note 19
32	BKC-DIP Echo Enabled	1	Note 11
33	BKC-DIP Update Enabled	1	Note 11
34	Front Panel Buttons Locked	1	Note 20

35	Front Panel IR Control Disabled	1	Note 20
36	Memory Locked	1	Note 20
37	Advanced Menu Visible	1	Note 21
39	Tuner Control Out 1	3	Note 22
3A	Tuner Control Out 2	5	Note 23
3B	Tuner Control Out 3	5	Note 23
3C	Tuner Control Out 4	5	Note 23
3D	V1 Control Out 1	3	Note 22
3E	V1 Control Out 2	5	Note 23
3F	V1 Control Out 3	5	Note 23
40	V1 Control Out 4	5	Note 23
41	V2 Control Out 1	3	Note 22
42	V2 Control Out 2	5	Note 23
43	V2 Control Out 3	5	Note 23
44	V2 Control Out 4	5	Note 23
45	TV (V3) Control Out 1	3	Note 22
46	TV (V3) Control Out 2	5	Note 23
47	TV (V3) Control Out 3	5	Note 23
48	TV (V3) Control Out 4	5	Note 23
49	DVD Control Out 1	3	Note 22
4A	DVD Control Out 2	5	Note 23
4B	DVD Control Out 3	5	Note 23
4C	DVD Control Out 4	5	Note 23
4D	CD Control Out 1	3	Note 22
4E	CD Control Out 2	5	Note 23
4F	CD Control Out 3	5	Note 23
50	CD Control Out 4	5	Note 23
51	SAT Control Out 1	3	Note 22
52	SAT Control Out 2	5	Note 23
53	SAT Control Out 3	5	Note 23
54	SAT Control Out 4	5	Note 23
55	Tape Control Out 1	3	Note 22
56	Tape Control Out 2	5	Note 23
57	Tape Control Out 3	5	Note 23
58	Tape Control Out 4	5	Note 23
59	Realtime Enable 0 register	FF	Note 24
5A	Realtime Enable 1 register	FF	Note 24
5B	Realtime Enable 2 register	FF	Note 24
5C	Monitor Aspect Ratio	1	Note 25
5D	Tuner RS232 Control Out State	F	Note 26
5E	V1 RS-232 Control Out State	F	Note 26
5F	V2 RS-232 Control Out State	F	Note 26
60	TV (V3) RS-232 Control Out State	F	Note 26
61	DVD RS-232 Control Out State	F	Note 26
62	CD RS-232 Control Out State	F	Note 26
63	SAT RS-232 Control Out State	F	Note 26
64	Tape RS-232 Control Out State	F	Note 26
65	Recall Volume	1	Note 20
66	Preset Auto Naming	1	Note 27
68	V1 Component Video	3	Note 28*
69	V2 Component Video	3	Note 28*
6A	TV (V3) Component Video	3	Note 28*
6B	DVD Component Video	3	Note 28*

6C	CD Component Video	3	Note 28*
6D	SAT Component Video	3	Note 28*
6E	TAPE Component Video	3	Note 28*
6F	Right Back Level Offset	30	Note 1
70	Left Back Level Offset	30	Note 1
71	Delay Units	1	Note 29
72	Left Delay	C6	Note 7
73	Right Delay	C6	Note 7
74	Right Surround Delay	C6	Note 7
75	Left Surround Delay	C6	Note 7
76	Sub Delay	C6	Note 7
77	Right Back Delay	C6	Note 7
78	Left Back Delay	C6	Note 7
79	Delay Out Of Range Map	FF	Note 30
7A	Surround Back Setting	4	Note 44
7B	Crossover Frequency	24	Note 31
7C	High Pass Slope	1	Note 42
7D	Low Pass Slope	3	Note 43
7E	DVD Audio Input	6	Note 32
7F	Notch Frequency	8C	Note 47
80	Notch Gain	25	Note 34
81	Notch Width	6	Note 35
82	Subwoofer Inversion	1	Note 20
83	Tuner Default Audio Mode	3	Note 48
84	V1 Default Audio Mode	4	Note 49
85	V2 Default Audio Mode	4	Note 49
86	TV (V3) Default Audio Mode	4	Note 49
87	DVD Default Audio Mode	4	Note 49
88	CD Default Audio Mode	4	Note 49
89	SAT Default Audio Mode	4	Note 49
8A	TAPE Default Audio Mode	3	Note 48
8B	Tuner Mono Mode Default Speaker Selection	9	Note 36
8C	Tuner Stereo Mode Default Speaker Selection	9	Note 36
8D	Tuner Surround Mode Default Speaker Selection	9	Note 36
8E	Tuner THX Mode Default Speaker Selection	9	Note 36*
90	V1 Mono Mode Default Speaker Selection	9	Note 36
91	V1 Stereo Mode Default Speaker Selection	9	Note 36
92	V1 Surround Mode Default Speaker Selection	9	Note 36
93	V1 THX Mode Default Speaker Selection	9	Note 36*
94	V1 DVD Audio Mode Default Speaker Selection	9	Note 36
95	V2 Mono Mode Default Speaker Selection	9	Note 36
96	V2 Stereo Mode Default Speaker Selection	9	Note 36
97	V2 Surround Mode Default Speaker Selection	9	Note 36
98	V2 THX Mode Default Speaker Selection	9	Note 36*
99	V2 DVD Audio Mode Default Speaker Selection	9	Note 36
9A	TV (V3) Mono Mode Default Speaker Selection	9	Note 36
9B	TV (V3) Stereo Mode Default Speaker Selection	9	Note 36
9C	TV (V3) Surround Mode Default Speaker Selection	9	Note 36
9D	TV (V3) THX Mode Default Speaker Selection	9	Note 36*
9E	TV (V3) DVD Audio Default Speaker Selection	9	Note 36
9F	DVD Mono Mode Default Speaker Selection	9	Note 36
A0	DVD Stereo Mode Default Speaker Selection	9	Note 36
A1	DVD Surround Mode Default Speaker Selection	9	Note 36

A2	DVD THX Mode Default Speaker Selection	9	Note 36*
A3	DVD DVD Audio Mode Default Speaker Selection	9	Note 36
A4	CD Mono Mode Default Speaker Selection	9	Note 36
A5	CD Stereo Mode Default Speaker Selection	9	Note 36
A6	CD Surround Mode Default Speaker Selection	9	Note 36
A7	CD THX Mode Default Speaker Selection	9	Note 36*
A8	CD DVD Audio Mode Default Speaker Selection	9	Note 36
A9	SAT Mono Mode Default Speaker Selection	9	Note 36
AA	SAT Stereo Mode Default Speaker Selection	9	Note 36
AB	SAT Surround Mode Default Speaker Selection	9	Note 36
AC	SAT THX Mode Default Speaker Selection	9	Note 36*
AD	SAT DVD Audio Mode Default Speaker Selection	9	Note 36
AE	TAPE Mono Mode Default Speaker Selection	9	Note 36
AF	TAPE Stereo Mode Default Speaker Selection	9	Note 36
B0	TAPE Surround Mode Default Speaker Selection	9	Note 36
B1	TAPE THX Mode Default Speaker Selection	9	Note 36
B3	Default EQ Selection	3	Note 37
B4	Default Bass Frequency	38	Note 38
B5	Default Bass Gain	30	Note 39
B6	Default Treble Frequency	8C	Note 40
B7	Default Treble Gain	30	Note 39
B8	Default LFE Attenuation	30	Note 41
BA	Default Dynamic Range	1	Note 50
BB	Peak Level Limit	30	Note 41
BC	Z1(A) Audio/Video Link	1	Note 46
BD	Z2(B) Audio/Video Link	1	Note 46
BE	Z2(B) Input Linked to Z1(A) Input	1	Note 20
BF	Z2(B) Power Linked to Z1(A) Power	1	Note 20
C0	Zone A Zone ID	62	Note 15*
C1	Zone B Zone ID	62	Note 15*
C2	Test Tone Frequency	8C	Note 47
C3	Realtime Enable 3 Register	7	Note 24
C4	Favorite Preset Recall Z1(A)	1	Note 51
C5	Favorite Preset Recall Z2(B)	1	Note 51
C6	Default TUNER Surround Decoder Type	4	Note 52
C7	Default V1 Surround Decoder Type	4	Note 52
C8	Default V2 Surround Decoder Type	4	Note 52
C9	Default TV (V3) Decoder Surround Type	4	Note 52
CA	Default DVD Surround Decoder Type	4	Note 52
CB	Default CD Surround Decoder Type	4	Note 52
CC	Default SAT Surround Decoder Type	4	Note 52
CD	Default TAPE Surround Decoder Type	4	Note 52
CE	Speaker Back Width	C6	Note 7
CF	THX Ultra 2 Subwoofer	1	Note 20
D0	THX Boundary Gain Compensation	1	Note 27
D1	Default DPLII Center Width	7	Note 53
D2	Default DPLII Dimension	7	Note 54
D3	Default DPLII Panorama	1	Note 20
D4	Default NEO:6 Center Image	5	Note 55
D5	Default TUNER Multi-Channel Surround Type	1	Note 56
D6	Default V1 Multi-Channel Surround Type	1	Note 56
D7	Default V2 Multi-Channel Surround Type	1	Note 56
D8	Default TV (V3) Multi-Channel Surround Type	1	Note 56

D9	Default DVD Multi-Channel Surround Type	1	Note 56
DA	Default CD Multi-Channel Surround Type	1	Note 56
DB	Default SAT Multi-Channel Surround Type	1	Note 56
DC	Default TAPE Multi-Channel Surround Type	1	Note 56
	System Parameter Aliases		Note 45
F8	All Inputs Control Out 1	3	Note 22
F9	All Inputs Control Out 2	5	Note 23
FA	All Inputs Control Out 3	5	Note 23
FB	All Inputs Control Out 4	5	Note 23
FC	Z2(B) Current Audio Input RS-232 Control Out State	F	Note 26
FD	Z1(A) Current Audio Input RS-232 Control Out State	F	Note 26

Appendix B, System Parameter Notes

(0,G,S,13;*cs16*) Example of Get System Surround Setting
(0,S,S,3="LASER";*cs16*) Example of Set DVD Title to "LASER"

(**NOTE:** hex values denoted by *xx*h convention)

Note 1: 0h = -12.0 dB, 1h = -11.5 dB, ... 18h = 0.0 dB, ...
30h = +12.0 dB
Note 2: 0h = Small, 1h = Large
Note 3: 0h = Manual, 1h = Auto
Note 4: 0h = Normal, 1h = Large, 2h = Direct
Note 5: 0h = None, 1h = Small, 2h = Large
Note 6: 0h = None, 1h = Yes, 2h = Ultra
Note 7: If Delay Units = Feet
0h = 0.0 ft, 1h = 0.5 ft,..., C6h = 99.0 ft
If Delay Units = Meters
0h = 0.0 m, 1h = 0.2 m, … , C6h = 39.6 m
Note 8: 0h = -6.0 dB, 1h = -5.5 dB, ... Ch = 0.0 dB,...18h = +6.0 dB
Note 9: 0h = Red, 1h = Green, 2h = Blue, 3h = Purple, 4h = Pink,
5h = Aqua, 6h = Lilac, 7h = Yellow, 8h = Black,
9h = Dark Grey, Ah = White
Note 10: 0h = Transparent Dark, 1h = Transparent Bright,
2h = Opaque Dark, 3h = Opaque Bright
Note 11: 0h = Disabled, 1h = Enabled
Note 12: 0h = Auto, 1h = Manual
Note 13: 0h = Low, 1h = Medium, 2h = High
Note 14: 0h = Mute, 1h = -95 dB,... 60h = 0 dB, ... 6Fh = +15 dB
Note 15: 0h = Zone ID 1, ... 62h = Zone ID 99*
Z1(Zone A) and Z2(Zone B) IDs cannot be the same value
***NOTE:** Max value is F in AVR 212, Reference 21,
AVR 315, AVR 317, and Reference 31.

NOTE: Changing the Zone ID requires that subsequent BKC-DIP messages (which specify zone) reflect this new setting.

For example: If the Zone A Zone ID has been set to 4, to get the volume of Zone A (now Zone 4) current preset,

the following command would be issued:

(0,S,P4=FF,01;*cs16*) Note P4=FF **NOT** P1=FF

Note 16: 0h = Tape Level, 1h = Line Level
Note 17: 0h = Fixed, 1h = Variable
Note 18: 0h = 1200, 1h = 2400, 2h = 9600, 3h = 14400, 4h = 19200, 5h = 28800, 6h = 38400, 7h = 57600, 8h = 115200
Note 19: Valid IDs are 00h to 7Fh. Receive IDs must be unique (to avoid ambiguity)
Note 20: 0h = No, 1h = Yes.
Note 21: 0h = Hidden, 1h = Visible
Note 22: 0h = Off, 1h = Zone 1 (A), 2h = Headphone, 3h = RS-232
Note 23: 0h = Off, 1h = Zone 1 (A), 2h = Zone 2 (B), 3h = Zone 1 (A)/ Zone 2 (B), 4h = Remote, 5h = RS-232
Note 24: Is a bit map to enable/disable specific Realtime Status event updates. Each bit represents its corresponding Realtime Status specifier (See **Appendix D**). 0h = disabled, 1h = enabled status for that specifier. For example, Realtime Enable 1 register = 3Eh indicates:

Bit	Specifier	Description	Status
0(LSB)	8h	Audio Coding	disabled
1	9h	PCM Deemphasis	enabled
2	Ah	OSD Display Update	enabled
3	Bh	FP Display Update	enabled
4	Ch	LED Buffer 0	enabled
5	Dh	LED Buffer 1	enabled
6	Eh	OSD Cursor Row Flashing	disabled
7(MSB)	Fh	OSD Cursor Col Flashing	disabled

Note 25: 0h = 4:3, 1h = 16:9
Note 26: Control Out State is a bit map of all 4 control outs for that specific input.

Bit	Value	Control Out
0	1h	Control Out 1
1	2h	Control Out 2
2	4h	Control Out 3
3	8h	Control Out 4

0 = Off, 1 = On.
For example, DVD Control Out State = Bh and input is DVD:
Control Out 1 on (Bit 0 = 1)
Control Out 2 off (Bit 1 = 0)
Control Out 3 on (Bit 2 = 1)
Control Out 4 on (Bit 3 = 1)

NOTE: **RS-232 Control Out settings are only valid if the particular Control Out Setting for that input is set to RS-232.** For example, assume the following:
Zone 1 (Zone A) is on
Zone 2 (Zone B) is off
Input is DVD

DVD Control Out 1	3h	(RS-232)
DVD Control Out 2	5h	(RS-232)
DVD Control Out 3	2h	(Zone 2 (B))

DVD Control Out 4 0h (off)

DVD RS-232 Control Out State is Bh

The control outs would be as follows:

Control Out 1	on (RS-232 active, Bit 0 = 1)
Control Out 2	off(RS-232 active, Bit 1 = 2)
Control Out 3	off(Zone 2 is off, DVD Control Out State Bit 2 is ignored because Zone 2 not RS-232 selected)
Control Out 4	off(DVD control Out 4 0h (off), Control Out State Bit 3 is ignored because Off not RS-232 selected)

Note 27: 0h = Off, 1h = On

Note 28: 0h = Off, 1h = Video 1, 2h = Video 2, 3h = Video 3

***NOTE:** Parameter is not available in AVR 212 or Reference 21. Off and Video 3 are not available in the AVR 315, AVR 317, or Reference 31.

Note 29: 0h = Feet, 1h = Meters

Note 30: The bit map represents current Delay status.
0h = in range, 1h = out of range.
For example, Delay Out Of Range = 3Eh indicates:

Bit	Description	Status
0(LSB)	Left Front Delay	in range
1	Center Delay	out of range
2	Right Front Delay	out of range
3	Right Surround Delay	out of range
4	Right Back Delay	out of range
5	Left Back Delay	out of range
6	Left Surround Delay	in range
7(MSB)	Sub Delay	in range

NOTE: After setting any of the delay parameters (System Identifiers 16h, and 72h – 79h) the Delay Out of Range Map should be polled to determine if any of the delay parameters' "out of range" status has changed.

Note 31: 0h = 20 Hz, 1h = 25 Hz, ..., 24h = 200 Hz

Note 32: 0h = None, 1h = V1, 2h = V2, 3h = TV/V3, 4h = DVD, 5h = CD, 6h = SAT

Note 33: 0h = 60 Hz, 1h = 62Hz, ..., 2Dh = 150Hz

Note 34: 0h = -Inf dB, 1h = -18.0 dB, ..., 25h = 0.0 dB

Note 35: The width is measured in Q, "Quality Factor". The higher the Q, the narrower the notch. Thus, the Notch Width Q settings are:

0h = 21.0, 1h = 18.0, ..., 6h = 3.0

As a more intuitive way of representing width, the Q and the center frequency can be used to calculate the frequency width of the notch. The equations for this are:

$Freq_{Low} = Freq_{Center} * (1 - (1/(2*Q)))$
$Freq_{High} = Freq_{Center} * (1 + (1/(2*Q)))$

Where $Freq_{Center}$ is the center frequency and Q is the quality factor of the filter.

Note 36: 0h = One Speaker, 1h = Two Speakers, 2h = Three Speakers, 3h = Four Speakers Sides, 4h = Four Speakers Back, 5h = Five Speakers Sides, 6h = Five Speakers Back, 7h = Six Speakers, 8h = Seven Speakers, 9h = Two Speakers Direct

Note 37: 0h = Off, 1h = Variable, 2h = Loudness, 3h = Theater

Note 38: 0h = 20 Hz, 1h = 25 Hz, ...,37h = 300Hz

Note 39: 0h = -18.0 dB, 1h = 17.5 dB,..., 24h = 0.0 dB, 30h = +6.0 dB

Note 40: 0h =2.0 kHz, 1h = 2.1 kHz, ...,8Ch = 16.0 kHz

Note 41: 0h = -24.0 dB, 1h = 23.5 dB, ..., 30h = 0.0 dB

Note 42: 0h = 6dB, 1h = 12dB

Note 43: 0h = External, 1h = 6 dB, 2h = 12 dB, 3h = 24 dB

Note 44: 0h = None, 1h = One Small, 2h = One Large, 3h = Two Small, 4h = Two Large

Note 45: System Parameter aliases implicitly refer to the corresponding Current Audio Input (either Z1(Zone A) or Z2(Zone B)) when referring to source specific parameters, or All inputs when denoted as "All" aliases.

Note 46: 0h = No, 1h = Yes. If Yes, changing corresponding zone's audio input forces video input the same, else No and the zone's video input is not affected by audio input changes.

Note 47: 0h = 20 Hz, 1h = 22 Hz, ..., 8Ch = 300 Hz

Note 48: 0h = Mono, 1h = Stereo, 2h = Surround, 3h = THX

Note 49: 0h = Mono, 1h = Stereo, 2h = Surround, 3h = THX, 4h = DVD Audio

Note 50: 0h = Normal, 1h = Reduced

Note 51: 0h = "ENTER" Button required to recall Favorite Preset, 1h = Automatically recall Favorite Preset

Note 52: 0h = NEO:6 Movie, 1h = NEO:6 Music, 2h = Dolby Pro Logic II Movie, 3h = Dolby Pro Logic II Music, 4h = Dolby Pro Logic

Note 53: 0h = 0, 1h = 1, … 7h = 7

Note 54: 0h = -3, 1h = -2, … 5h = -+2, 7h = +3

Note 55: 0h = 0.0, 1h = 0.1, … 5h = 0.5

Note 56: 0h = Surround Movie, 1h = Surround Music, 2h = THX Movie, 3h = THX Music

Note 57: 0h = None, 1h = All, 2h = User

Appendix C, Tuner Station Parameters

Tuner Stations are not supported in Series III.

Appendix D, Realtime Status Parameters

(0,G,R,5;*cs16*) Example of Get Sample Rate
(0,S,S,59=20;*cs16*) Example of Set Realtime Sample Rate Update

Parameter Identifier (in hex)	Bit/ RealTime Register	Description	Parameter Max Values (in hex)	Formatting Notes
00	0/0	Analog Input Presence	1	Note 1
01	1/0	Analog Output Presence	1	Note 1
02	2/0	Digital Mode	2	Note 2
03	3/0	Video Mode	4	Note 15
04	4/0	DSP Mode	9	Note 3
05	5/0	Sample Rate	3	Note 4
06	6/0	Category Code	7F	Note 5
07	7/0	PnP Surround Mode	4	Note 6
08	0/1	Audio Coding Mode	F	Note 7
09	1/1	PCM Deemphasis	1	Note 8
0A	2/1	OSD Display Update	1	Note 9
0B	3/1	Front Panel Display Update	1	Note 9
0C	4/1	LED Buffer 0	FF	Note 10
0D	5/1	LED Buffer 1	7D	Note 10
0E	6/1	OSD Cursor Row Flashing	B	Note 11
0F	7/1	OSD Cursor Column Flashing	1C	Note 11
10	0/2	Front Panel Column Flashing	20	Note 11
11	1/2	BKC DIP Display Override	1	Note 12
12	2/2	Menu Mode	1	Note 13
13	3/2	Zone 1 (A) Power	1	Note 14
14	4/2	Zone 2 (B) Power	1	Note 14
15	5/2	Zone 1 (A) Mute	1	Note 14
16	6/2	Zone 2 (B) Mute	1	Note 14
17	7/2	Digital Mode Z2(B)	2	Note 2
18	0/3	FM Stereo Detect	1	Note 16
19	1/3	Tuner Stereo State	1	Note 17
1A	2/3	Speaker Usage	F	Note 18

Appendix D, Realtime Status Parameter Notes

(0,G,R,5;*cs16*) Example of Get Sample Rate
(0,S,S,59=20;*cs16*) Example of Set Realtime Sample Rate Update

(**NOTE:** hex values denoted by *xx*h convention)

Note 1: 0h = signal not present, 1h = signal present
Note 2: 0h = no digital, 1h = coax active, 2h = optical active
Note 3: 0h = Unknown Mode, 1h = AC3 Mode, 2h = AC3 RF Mode, 3h = AC3 DVD Mode, 4h = DTS Mode, 5h = DTS DVD Mode, 6h = PCM Mode, 7h = DIGILOG Mode, 8h = Analog Mode, 9h = Noise Mode,
Note 4: 0 = 32 kHz, 1 = 44.1 kHz, 2 = 48kHz, 3 = 64 kHz, 4h = 88.2 kHz, 5h = 96 kHz
Note 5: refer to IEC-958 for a complete listing

some common codes:
01h = CD/LD,
03h = DAT,
09h = LD RF AC3,
0Bh = DVHS,
19h = DVD,
49h = MD

Note 6: 0h = Mono, 1h = 3 Stere, 2h = Surround,
3h = THX, 4h = DVD Audio

Note 7:
0h = 2.0 (dual mono, no center, no rear, no LFE),
1h = 1.0 (mono, only center, no rear, no LFE),
2h = 2.0 (stereo, no center, no rear, no LFE),
3h = 3.0 (stereo, center, no rear, no LFE),
4h = 3.0 (stereo, no center, mono rear, no LFE),
5h = 4.0 (stereo, center, mono rear, no LFE),
6h = 4.0 (stereo, no center, stereo rear, no LFE),
7h = 5.0 (stereo, center, stereo rear, no LFE),
8h = 2.1 (dual mono, no center, no rear, LFE),
9h = 1.1 (mono, only center, no rear, LFE),
Ah = 2.1 (stereo, no center, no rear, LFE),
Bh = 3.1 (stereo, center, no rear, LFE),
Ch = 3.1 (stereo, no center, mono rear, LFE),
Dh = 4.1 (stereo, center, mono rear, LFE),
Eh = 4.1 (stereo, no center, stereo rear, LFE),
Fh = 5.1 (stereo, center, stereo rear, LFE),

PCM data streams always returns 0h, 2.0.
DTS data streams always returns Fh, 5.1 (which is not necessarily correct).

Note 8: 0h = no deemphasis, 1h = deemphasis

Note 9: 0h = no display update, 1h = display updated.
Except during explicit BKC-DIP display writes to either the OSD or the Front Panel, the B&K device always updates both displays. To reduce bandwidth requirements of the host, usually enabling the Front Panel Display Update is sufficient for monitoring display refreshes.

Note 10: Front Panel LED indicating status is mapped into 2 LED Buffers specified as LED Buffer 0 and LED Buffer 1. This bit map represents which LEDs are currently lit. See **Appendix K** for a complete listing of LED mapping.

Note 11: The cursor character is primarily used when editing titles. The cursor coordinates are sent every time the cursor flashes (at a rate of approximately 2 Hz, twice per second), so it can be used to for both position and timing information.

Note 12: 0h = Normal Display Content, 1h = BKC-DIP Overriding Display Content

Note 13: 0h = Overlay Mode (over video if present), 1h = Menu Mode

Note 14: 0h = Off, 1h = On. To set these global parameters issue (Set) the appropriate IR commands.

Note 15: 0h = No Video, 1h = S-Video, 2h = Composite Video,
3h = Both Video, 4h = Unknown Video

Note 16: 0h = Mono Tuner station, 1h = Stereo Tuner station

Note 17: 0h = Mono, 1h = Stereo

Note 18:

Value	Speakers
0h	L,R (LtRt)
1h	C
2h	L,R
3h	L,C,R
4h	L,R,Sl,Sr
5h	L,R,Sbl (mono Surround Back)
6h	L,R,Sbl,Sbr (stereo Surround Backs)
7h	L,C,R,Sl,Sr
8h	L,C,R,Sbl (mono Surround Back)
9h	L,C,R,Sbl,Sbr (stereo Surround Backs)
Ah	L,R,Sl,Sr,Sbl (mono Surround Back)
Bh	L,R,Sl,Sr,Sbl,Sbr (mono Surround Backs)
Ch	L,C,R,Sl,Sr,Sbl (mono Surround Back)
Dh	L,C,R,Sl,Sr,Sbl,Sbr (mono Surround Backs)
Eh	L,R,Sl,Sr,Sbl,Sbr (stereo Surround Backs)
Fh	L,C,R,Sl,Sr,Sbl,Sbr (stereo Surround Backs)

Where:

L	= Front Left Speaker
C	= (Front) Center Speaker
R	= Front Right Speaker
Sl	= Surround (Side) Left Speaker
Sr	= Surround (Side) Right Speaker
Sbl	= Surround Back Left Speaker
Sbr	= Surround Back Right Speaker

Appendix E, Unit Parameters

(0,G,F4,0;*cs16*) Example of Get Unit Name
(0,G,F4,1;*cs16*) Example of Get Version
(0,G,F4,C;*cs16*) Example of Get BKC-DIP Version

Parameter Identifier (in hex)	**Description**
00	Unit name
01	Version
02	Number of Zones
03	Number of DSPs
04	DTS (if available)
05	Dolby Digital (if available)
06	Power amp
07	PAL/NTSC
08	AM steps 9kHz/10kHz
09	FM steps 100kHz/200kHz
0A	ADC resolution
0B	DAC resolution
0C	BKC-DIP Version
0D	Software Time Stamp
0E	CHIRP Protocol (if available)
0F	THX (if available)
10	Unit Serial Number (available V2.02 and later)

Appendix F, IR Commands

(0,S,I,1=2;*cs16*) Example of Set Zone 1 (Zone A) IR Save
(0,S,I,2=24;*cs16*) Example of Set Zone 2 (Zone B) IR Volume +

IR Command (in hex)	IR Description
02	SAVE
04	(BALANCE) RIGHT
0C	ENTER
14	ALL B&K POWER OFF
15	ALL B&K POWER ON
16	ALL B&K VOL DOWN
17	ALL B&K VOL UP
18	STATION +
19	ALL B&K 0 dB VOL
1A	ALL B&K -20 dB VOL
1B	ALL B&K -40 dB VOL
1C	REVIEW
1D	ALL B&K -60 dB VOL
1E	ALL B&K MUTE
24	MASTER VOL +
38	TUNE +
3B	OSD OFF
3C	DISPLAY (TOGGLE)
3D	OSD ON
40	POWER ON
44	REAR DLY +
45	POWER (TOGGLE)
47	STEREO
48	FREQ
4C	2
4D	MUSIC
4E	MOVIE
51	THX
52	SAT
53	SURROUND
54	EQ
55	DTS NEO:6 (NEO:6)
56	DOLBY PRO LOGIC (DPL)
57	DOLBY PRO LOGIC II (DPL II)
58	REAR LVL +
59	MONO
5C	8
60	TV/V3
63	PRESET -
64	MODE +
65	SOURCE –
66	SOURCE +
67	DISPLAY OFF
68	CENTER LVL +

69	DISPLAY ON
6C	5
6E	AM
70	TUNER
71	FM
72	PANORAMA ON
73	PANORAMA OFF
74	UP
77	IMAGE -
78	SUB LVL +
79	IMAGE +
7C	0
7F	DIMENSION -
80	POWER OFF
81	DIMENSION +
84	REAR DLY -
8C	1
90	V2
94	+10
98	REAR LVL -
9C	7
9E	TREBLE FRONT -
9F	TREBLE FRONT +
A0	V1
A4	TEST
A6	BASS FRONT -
A7	BASS FRONT +
A8	CENTER LVL -
AC	4
B0	DVD/VLD
B4	DN
B8	SUB LVL -
BC	*
BE	EXIT (RETURN)
C0	MUTE
C4	MASTER VOL -
C8	BAND
CC	3
D0	TAPE (TOGGLE)
D2	PRESET +
D4	DVD_AUDIO
D7	ST/M
D8	TUNE -
DC	9
E8	STATION -
EC	6
F0	CD
F1	MUTE ON
F2	MUTE OFF
F3	LOUDNESS (TOGGLE)
F4	MENU
F8	(BALANCE) LEFT
FC	ZONE (#)

Appendix G, Front Panel Commands

(0,S,F,1=1;*cs16*) Example of Set Zone 1 (A) FP Sleep
(0,S,F,2=1;*cs16*) Example of Set Zone 2 (B) FP Sleep

Identifier (in hex)	**Front Panel Switch**	**Function**
01	SLEEP	Unit Sleep Toggle
02	PRESET	Increment Preset
03	ENTER	Enter
04	SAVE	Save
05	DOWN	Down
06	UP	Up
07	SOURCE UP	Increment Source
08	MODE	Increment Mode
09	MENU	Menu
0A	VOLUME DOWN	Volume Knob Down
0B	VOLUME UP	Volume Knob Up
0C	CHORD 0: SLEEP + DOWN + UP	Advanced Settings Visible
0D	CHORD 1: SLEEP + DOWN + SOURCE	Restore User Preference Memory
0E	CHORD 2: SLEEP + UP + SOURCE	Factory Reset Unit
0F	SOURCE DOWN*	Decrement Source

*NOTE: SOURCE DOWN not supported on “upgrade” platforms, on AVR 505, AVR 507, and Reference 50.

Appendix H, Valid ASCII Display Characters

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789 -+/?=*'
```

Appendix I, Special Display Characters

Character (in hex)	Description
64	no tick symbol (long dash)
65	left 1/4 tick symbol
66	left middle 1/4 tick symbol
67	right middle 1/4 tick symbol
68	right 1/4 tick symbol
72	1/6 of solid vertical bar
73	2/6 of solid vertical bar
74	3/6 of solid vertical bar
75	4/6 of solid vertical bar
76	5/6 of solid vertical bar
77	6/6 of solid vertical bar
6E	satellite symbol
79	G clef symbol
7A	right facing arrow
7B	left facing arrow
7C	upward facing arrow
7D	downward facing arrow
7E	key symbol
71	heart symbol

Appendix J, ASCII Table

Decimal	Hex	ASCII	Decimal	Hex	ASCII
0	0	xx	64	40	@
1	1	xx	65	41	A
2	2	xx	66	42	B
3	3	xx	67	43	C
4	4	xx	68	44	D
5	5	xx	69	45	E
6	6	xx	70	46	F
7	7	xx	71	47	G
8	8	xx	72	48	H
9	9	xx	73	49	I
10	A	xx	74	4A	J
11	B	xx	75	4B	K
12	C	xx	76	4C	L
13	D	xx	77	4D	M
14	E	xx	78	4E	N
15	F	xx	79	4F	O
16	10	xx	80	50	P
17	11	xx	81	51	Q
18	12	xx	82	52	R
19	13	xx	83	53	S
20	14	xx	84	54	T
21	15	xx	85	55	U
22	16	xx	86	56	V
23	17	xx	87	57	W
24	18	xx	88	58	X
25	19	xx	89	59	Y
26	1A	xx	90	5A	Z
27	1B	xx	91	5B	[
28	1C	xx	92	5C	\
29	1D	xx	93	5D	]
30	1E	xx	94	5E	^
31	1F	xx	95	5F	_
32	20		96	60	`
33	21	!	97	61	a
34	22	"	98	62	b
35	23	#	99	63	c
36	24	$	100	64	d
37	25	%	101	65	e
38	26	&	102	66	f
39	27	'	103	67	g
40	28	(	104	68	h
41	29	)	105	69	i
42	2A	*	106	6A	j
43	2B	+	107	6B	k
44	2C	,	108	6C	l
45	2D	-	109	6D	m
46	2E	.	110	6E	n
47	2F	/	111	6F	o
48	30	0	112	70	p
49	31	1	113	71	q
50	32	2	114	72	r
51	33	3	115	73	s
52	34	4	116	74	t
53	35	5	117	75	u
54	36	6	118	76	v
55	37	7	119	77	w
56	38	8	120	78	x
57	39	9	121	79	y
58	3A	:	122	7A	z
59	3B	;	123	7B	{
60	3C	<	124	7C	|
61	3D	=	125	7D	}
62	3E	>	126	7E	~
63	3F	?	127	7F	xx

NOTE: xx indicates non printable character

Appendix K, LED Mapping

```
LED Buffer 0
01h = UP
02h = MENU
04h = MODE
08h = SOURCE
10h = PRESET
20h = SLEEP
40h = ENTER
80h = SAVE

LED Buffer 1
01h = DOWN
02h = <NOT USED>
04h = Dolby Pro Logic
08h = 96/24
10h = Dolby Digital
20h = DTS
40h = Analog
80h = <NOT USED>
```

NOTE: Due to the front panel electronics, only one of each of the following electrical banks of LEDs should be active at a time:

Electrical Bank A
UP, MENU, MODE, SOURCE, PRESET, SLEEP, ENTER, SAVE, DOWN

Electrical Bank B
Dolby Pro Logic, 96/24, Dolby Digital, DTS, Analog
Therefore:

(D, L, T00, 0=48;*cs16*)	Invalid, both PRESET and SOURCE cannot be active
(D, L, T00, 0=04;*cs16*)	Valid, only MODE active
(D, L, T32, 0=02, 1=01;*cs16*)	Invalid, both SAVE and DOWN cannot be active. Different LED buffers, but the same electrical bank
(D, L, T64, 1=41;*cs16*)	Valid, DOWN and ZONE 2 (B) are in different electrical banks, but the same LED buffer

Appendix L, X (executive) Commands

The following is a list of the supported Executive commands and details regarding their usage:

Recall Preset Command: (*receiveID*, X, 0, *z=nn*; *cs16*)

Zone *z* Preset *nn* is recalled to the current preset. Similar to the "G" get and "S" set commands, *nn* can range from 00h – FDh, however it **CANNOT** be FFh for the current preset (as recalling the current preset has no meaning).

NOTE: *nn* of FE is reserved for future expansion.

(00, X, 0, 1=4;*cs16*)	Recall Zone 1 Preset 4 to current preset
(00, X, 0, 2=7;*cs16*)	Recall Zone 2 Preset 7 to current preset

Save Preset Command: (*receiveID*, X, 1, *z=nn*, *autoNameMode*; *cs16*)

The current preset is saved to Zone *z* Preset *nn*. . Similar to the "G" get and "S" set commands, *nn* can range from 00h – FDh, however it **CANNOT** be FFh for the current preset (as saving the current preset has no meaning).

NOTE: *nn* of FE is reserved for future expansion.

(00, X, 1, 1=3;*cs16*)	Save current preset to Zone 1 Preset 3
(00, X, 1, 2=9;*cs16*)	Save current preset to Zone 2 Preset 9

The *autoNameMode* specifier can take on the following values with the following meanings:

0	Auto Name Preset, based upon state of System parameter Preset Auto Naming
1	Do not Auto Name, regardless of System parameter Preset Auto Naming
2	Force Auto Name, regardless of System parameter Preset Auto Naming

(00, X, 1, 1=8, 0;*cs16*)	Save current preset to Zone 1 Preset 8 Auto Name based on Preset Auto Naming parameter
(00, X, 1, 1=8, 1;*cs16*)	Save current preset to Zone 1 Preset 8 Do not Auto Name, preserve Preset Title
(00, X, 1, 1=8, 2;*cs16*)	Save current preset to Zone 1 Preset 8 Force Auto Naming, overwriting Preset Title

NOTE: If Preset Auto Naming is active, the preset title will be overwritten.

NOTE: The *autoNameMode* specifier is optional. If it is omitted its value defaults to 0, so the preset title is Auto Named based on the state of the System parameter Preset Auto Naming.

Power State Command: (*receiveID*, X, 2, *z=onOff*; *cs16*)

Zone *z*'s power state may be controlled using this command. The *onOff* parameter may take on the values of 1 or 0 for "on" or "off (Sleep)" respectively.

(00, X, 2, 1=1;*cs16*)	Turn Z1 power on (unit not in Sleep)
(00, X, 2, 2=0;*cs16*)	Turn Z2 power off (unit in Sleep)

NOTE: A Power State Command "on" is referred to as a "Warm Boot".

Noise Generator State Command: (*receiveID*, X, 3, *noiseState*; *cs16*)

The B&K Component's built in noise generator can be deactivated, activated in Regular Noise, or activated in Peak Level Limiter Noise using this command. The noiseState parameter may take on the values of 0, 1, and 2 meaning "deactivate noise generator", "activate Regular Noise generator", and "activate Peak Level Limiter Noise generator" respectively.

(00, X, 3, 1;*cs16*)	Regular Noise generator activated
(00, X, 3, 2;*cs16*)	Peak Level Limiter Noise generator activated
(00, X, 3, 0;*cs16*)	Noise generator deactivated

NOTE: Noise is initially output to the Left Front speaker. The following Noise Steering and Noise Increment commands can be used to control the routing of the noise to various speakers. Each time the noise generator is activated, the noise routing is again reset to the Left Front speaker.

NOTE: When the unit is in "Sleep", attempts to activate the noise generator are ignored.

Noise Steering Command: (*receiveID*, X, 4, *speakerIndex=onOff*, *... speakerIndex=onOff*; *cs16*)

The B&K Components' built in noise generator can be routed to specific speaker outputs. The *speakerIndex* specifies which speaker and *onOff* determines whether noise is or is not routed to that particular speaker.

The speaker index mapping for currently supported speakers is as follows:

0	Left Front
1	Center
2	Right Front
3	Right Surround
4	Right Back
5	Left Back
6	Left Surround
7	Subwoofer

NOTE: Noise routed to multiple speakers simultaneously is not supported on this B&K Components device. If more than one speaker is set to the on state, the first "on" speaker will have noise routed to it, and all others will be "off"

Attempting to route noise to the Right Back and Subwoofer simultaneously the command would be:

(00, X, 4, 4=1, 7=1; *cs16*) Noise routed to Right Back, Subwoofer off

Since the Subwoofer on state is ignored, the following is an equivalent command:

(00, X, 4, 4=1; *cs16*) Noise routed to Right Back

NOTE: Each time the Noise Steering Command is issued, all previous speaker routing states are cleared.

NOTE: Off states, "0"s are implicit since every occurrence of the Noise Steering Command

clears all speaker routing states (the same as setting them all to "0").

For example if previously noise was routed to Left Front:

(00, X, 4, 0=1; *cs16*)

And now it is desired to route noise to the Right Back the command would be:

(00, X, 4, 4=1; *cs16*)

Notice that the state of the Left Front has implicitly been set to off by the second command explicitly turning the Right Back on.

Noise Increment Command: (*receiveID*, X, 5; *cs16*)

This command routes the built in noise generator to the next available speaker in the system. By using the Noise Generator State Command to activate the noise generator, the starting state of the noise routing reset to the Left Front speaker. Which speaker is next available depends on the System settings. Some possible sequences are as follows:

Left and Right Fronts, Center, Left and Right Surrounds, Left and Right Backs, and Subwoofer

(0,X,3,1;*cs16*)	Activate noise generator, Noise output Left Front
(0,X,5;*cs16*)	Increment noise output Center
(0,X,5;*cs16*)	Increment noise output Right Front
(0,X,5;*cs16*)	Increment noise output Right Surround
(0,X,5;*cs16*)	Increment noise output Right Back
(0,X,5;*cs16*)	Increment noise output Left Back
(0,X,5;*cs16*)	Increment noise output Left Surround
(0,X,5;*cs16*)	Increment noise output Subwoofer
(0,X,5;*cs16*)	Increment noise output Left Front

Left and Right Fronts, No Center, Left and Right Surrounds, Left and Right Backs, and Subwoofer

(0,X,3,1;*cs16*)	Activate noise generator, Noise output Left Front
(0,X,5;*cs16*)	Increment noise output Right Front
(0,X,5;*cs16*)	Increment noise output Right Surround
(0,X,5;*cs16*)	Increment noise output Right Back
(0,X,5;*cs16*)	Increment noise output Left Back
(0,X,5;*cs16*)	Increment noise output Left Surround
(0,X,5;*cs16*)	Increment noise output Subwoofer
(0,X,5;*cs16*)	Increment noise output Left Front

Left and Right Fronts, No Center, Left and Right Surrounds, No Left and Right Backs, and No Subwoofer

(0,X,3,1;*cs16*)	Activate noise generator, Noise output Left Front
(0,X,5;*cs16*)	Increment noise output Right Front
(0,X,5;*cs16*)	Increment noise output Right Surround
(0,X,5;*cs16*)	Increment noise output Left Surround
(0,X,5;*cs16*)	Increment noise output Left Front

Left and Right Fronts, No Center, No Left and Right Surrounds, Left and Right Backs, and No Subwoofer

(0,X,3,1;*cs16*)	Activate noise generator, Noise output Left Front
(0,X,5;*cs16*)	Increment noise output Right Front
(0,X,5;*cs16*)	Increment noise output Right Back
(0,X,5;*cs16*)	Increment noise output Left Back
(0,X,5;*cs16*)	Increment noise output Left Front

Left and Right Fronts, No Center, No Left and Right Surrounds, No Left and Right Backs, and No Subwoofer

(0,X,3,1;*cs16*)	Activate noise generator, Noise output Left Front
(0,X,5;*cs16*)	Increment noise output Right Front
(0,X,5;*cs16*)	Increment noise output Left Front
(0,X,5;*cs16*)	Increment noise output Right Front

Cold Boot Command: (*receiveID*, X, 6; *cs16*)

This forces the unit to do a "Cold Boot", which is the same sequence of events that occur when the unit is turned on from the power on/off switch. This differs from a "Warm Boot" (Power State Command with onOff state of 1) in that all of the unit's hardware is re-initialized.

NOTE: After issuing a Cold Boot command, the unit's communication port is reinitialized. Communication will have to be re-established. The unit cannot receive BKC-DIP commands until the Update Unit "BKC-DIP ACTIVE" reply has been transmitted by the unit (see Update Command below for further details).

Factory Reset Command: (*receiveID*, X, 7; *cs16*)

This command executes the factory reset sequence in the unit. The factory reset returns the state of the unit to its original factory settings.

WARNING!: Issuing a Factory Reset Command will destroy all user modified data in the unit (preset, system settings, etc.).

NOTE: After issuing a Factory Reset command, the unit's communication port is reinitialized. Communication will have to be re-established. The unit cannot receive BKC-DIP commands until the Update Unit "BKC-DIP ACTIVE" reply has been transmitted by the unit (refer to the Update Command in the **BKC-DIP Specification** for further details).

Reinitialize BKC-DIP State Command: (*receiveID*, X, 8; *cs16*)

There are certain parameters and settings that are only available via BKC-DIP. On cold boot, these states are reset. It may be desirable to reset these states without performing a cold boot. The Reinitialize BKC-DIP State does the following:

1. Exits Override mode (setting Active to False), resets the acknowledge timeout to 0, and resets all other override parameters to their corresponding System Settings (i.e. the Override Baud Rate is reset to the System Baud Rate)
2. Disables all Realtime events
3. Restores Audio/Video linked on all zones
4. Resets all RS232 control out states for all inputs to off

NOTE: This command does not reset the state of the BKC-DIP parser.

Test Tone State Command: (*receiveID*, X, 9, *level*; *cs16*)

This command is used to activate the Test Tone and set its level. *Level* can be 0, 1, 2, or 3 corresponding to Off, -42.0 dB, -36.0 dB, and –30.0 dB respectively.

(0, X, 9, 1; *cs16*)	Test Tone generator On at –42.0 dB
(0, X, 9, 2; *cs16*)	Test Tone generator On at –36.0 dB
(0, X, 9, 3; *cs16*)	Test Tone generator On at –30.0 dB
(0, X, 9, 0; *cs16*)	Test Tone generator Off

NOTE: The Test Tone frequency is controlled by the System parameter Test Tone Frequency (see **Appendix B** for details).

Mute State Command: (*receiveID*, X, A, *z=muteState*; *cs16*)

This command is used to mute/unmute particular zones where *z* is the zone number and *muteState* is 0 or 1 (unmuted or muted).

(0, X, A, 1=1; *cs16*)	Mute Zone 1
(0, X, A, 1=0; *cs16*)	Unmute Zone 1
(0, X, A, 2=1; *cs16*)	Mute Zone 2
(0, X, A, 2=0; *cs16*)	Unmute Zone 2

NOTE: This mute is the same as muting from an IR command. It also follows the same logic, specifically that a Volume Up message on a specific zone will unmute that zone.

Appendix M, Error Logs

(0,G,E,0,2;*cs16*)	Get Preserved State and Non-Volatile Memory error logs
(0,S,E,0=0,1=0,2=0,3=0;*cs16*)	Clear all error logs

The following is a list of the supported Error Logs and details regarding their meaning:

Preserved State Error, Identifier 0

The preserved state of the unit is that information which remains across a cold boot, but NOT in a specific preset. Some examples are the current input and the volume of the unit when power was removed.

Upon cold boot, the preserved state of the unit is recalled from non-volatile memory. Before reinstating the value into the unit, it is compared against its maximum value. If the value is out of range, the unit reverts to a default value and logs this as a Preserved State Error.

The presence of a Preserved State Error could indicate the degradation of the non-volatile memory device (see **Non-Volatile Memory Error** below), or a power fluctuation during the storing of the preserved state.

Unused RAM Error, Identifier 1

There are unused portions of RAM (Random Access Memory) in the system. These are initialized to zero. Periodically these unused portions are scanned. In the event that something has corrupted the unused RAM, this is logged as an Unused RAM Error. Since, by definition, this memory is unused and error of this type does not affect the system in any manor.

The presence of an Unused RAM error could indicate the occurrence of a power glitch (i.e. lightening strike).

Non-Volatile Memory Error, Identifier 2

Information, which must be maintained while power is not applied to the unit, is stored in non-volatile memory. This includes the Preserved State, Preset information, and System Settings.

When writing the data to the non-volatile memory device, read back to verify the write. If the values do not match, this process is repeated. If after several attempts the value cannot be successfully written and verified, it is logged as a non-volatile memory error.

The presence of a Non-Volatile Memory error could indicate the degradation of the non-volatile memory device.

DSP Boot Error, Identifier 3

The device responsible for processing audio in the unit is called a DSP (Digital Signal Processor). The host processor (the on-board computer responsible for the user interface (switches, displays, LEDs, RS-232, etc.)) is responsible for booting (initializing) the DSP.

If the DSP fails to boot properly after multiple attempts, the host processor reboots the entire system and logs a DSP Boot error.

The presence of a DSP Boot error could indicate poor communication between the host processor and the DSP, or possibly a damaged DSP board.

Appendix P, Override Parameters

(0,G,O,0;*cs16*) Example of Get Override Active state
(0,S,O,4=1;*cs16*) Example of Set Echo Enabled

Parameter Identifier (in hex)	Description	Default Values (in hex)	Parameter Max Values (in hex)	Formatting Notes
00	Override Active	0	1	Note 1
01	RS 232 Baud Rate	3	8	Note 2
02	BKC-DIP Receive ID	00	7F	Note 3
03	BKC-DIP Transmit ID	00	7F	Note 3
04	BKC-DIP Echo Enabled	1	1	Note 4
05	BKC-DIP Update Enabled	1	1	Note 4
06	Front Locked	0	1	Note 1
07	IR Locked	0	1	Note 1
FF	Override Timeout	0	FF	Note 5

Appendix P, Override Parameters Notes

(0,G,O,0;*cs16*) Example of Get Override Active state
(0,S,O,4=1;*cs16*) Example of Set Echo Enabled

Note 1: 0h = No, 1h = Yes
Note 2: 0h = 1200, 1h = 2400, 2h = 9600, 3h = 14400, 4h = 19200, 5h = 28800, 6h = 38400, 7h = 57600, 8h = 115200
Note 3: Valid IDs are 00h to 7Fh. Receive IDs must be unique (to avoid ambiguity)
Note 4: 0h = Disabled, 1h = Enabled
Note 5: 0h = No timeout, 1h = 0.1 second timeout … FFh = 25.5 second timeout

Appendix Q, Status Messages

(0,U,S,0="BKC-DIP ACTIVE";05FE) Example Status Message

Message Number	Message	Indication
0	(*receiveID*,U,S,0="BKC-DIP ACTIVE";*cs16*)	BKC-DIP interface is active Device is ready to accept BKC-DIP commands
1	(*receiveID*,U,S,1=”CHIRP PROCESSING ENABLED;*cs16*)	Indicates CHIRP processing enabled
2	(*receiveID*,U,S,2=”DSP BLOCKED”;*cs16*)	Indicates writes to DSP have been disabled
3	(*receiveID*,U,S,3=”DSP DEAD, DSP RE-INIT”;*cs16*)	Indicates DSP failure and reboot intiated